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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/756,133	01/09/2001	Niles A. Fleischer	196/36	6526
22827	7590	05/04/2005	EXAMINER	
DORITY & MANNING, P.A. POST OFFICE BOX 1449 GREENVILLE, SC 29602-1449			ALEJANDRO, RAYMOND	
			ART UNIT	PAPER NUMBER
			1745	

DATE MAILED: 05/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/756,133

Applicant(s)

FLEISCHER ET AL.

Examiner

Raymond Alejandro

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 December 2004 and 07 January 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 31-60 and 63-92 is/are pending in the application.
- 4a) Of the above claim(s) 34-36, 41-45, 50-55, 66-68, 73-77 and 82-87 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 31-33, 37-40, 46-49, 56-60, 63-65, 69-72, 78-81 and 88-92 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03/09/01 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/28/04 and 01/07/05 has been entered.

This office communication is being provided in reply to the amendment accompanying the foregoing RCE. The applicants have overcome the 35 USC 102 rejections. Refer to the abovementioned amendment for specific details on applicant's rebuttal arguments. In addition, the indicated allowable subject matter of claims 38, 40 and 56-59 is withdrawn in view of a newly discovered reference. Rejections based on the newly cited reference(s) follow. Thus, the present claims (including newly added claims 63-65, 69-72, 78-81 and 88-92) are rejected again over new art as set forth hereinbelow and for the reasons of record:

Election/Restrictions

1. Applicant's election of claims 31-33, 37-40, 46-49 and 56-60 in the reply filed on 08/11/03 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).
2. Newly submitted claims 66-68, 73-77 and 82-87 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: the foregoing claims are deemed to be directed to distinct and/or independent invention by virtue of

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their claimed subject matter which has been previously withdrawn from consideration as being directed to a non-elected invention. Refer to the Restriction Requirement of 09/16/02 and the response of 08/11/03. Thus, claims 66-68, 73-77 and 82-87 encompass a non-elected invention and/or subject matter.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claim 66-68, 73-77 and 82-87 are further withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

3. With respect to the current disposition of claim 60, upon a careful review of the Restriction Requirement of 09/16/02 and the response of 08/11/03, the examiner herein acknowledges that claim 60 was originally grouped in elected Group II, and therefore, the examiner agrees that it should remain under active examination. Hence, the current status of claim 60 should be changed from “*withdrawn*” to “*previously presented*” (or “*currently amended*” if applicants further intend to do so) so as to be consistent with the present prosecution and the respective status identifier of all active claims.

Drawings

4. The drawings were received on 03/09/01. These drawings are acceptable.

Specification

5. The amendment filed 04/06/04 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: (claims 31 and 60) “*wherein said proton conducting membrane is a single-phase, substantially non-porous structure*”. It is noted that the original specification fails to provide support for having combined both the hydrophobic matrix polymer and the hydrophilic non-ionic polymer to form a single phase per se and non-porous structure. Although applicants have provided a lengthy explanation and citations as to where in the specification such recitation may be found, it is still stated that the specification as filed does not disclose such specific characteristics in combination. The paragraphs noted by the applicants discuss single phase membranes in general terms, but do not discuss specifics of single phase membranes and their respective non-porous characteristics for the hydrophobic matrix polymer and the hydrophilic polymer.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 31-33, 37-40, 46-49 and 56-60 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject

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matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The added material which is not supported by the original disclosure is as follows: (claims 31 and 60) "*wherein said proton conducting membrane is a single-phase, substantially non-porous structure*". It is noted that the original specification fails to provide support for having combined both the hydrophobic matrix polymer and the hydrophilic non-ionic polymer to form a single phase per se and non-porous structure. Although applicants have provided a lengthy explanation and citations as to where in the specification such recitation may be found, it is still stated that the specification as filed does not disclose such specific characteristics in combination. The paragraphs noted by the applicants discuss single phase membranes in general terms, but do not discuss specifics of single phase membranes and their respective non-porous characteristics for the hydrophobic matrix polymer and the hydrophilic polymer. Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various

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claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 31-33, 37, 39, 56-60, 63-65, 69, 71 and 88-92 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oka et al 5830603 in view of Hedge et al 6395325.

As to claims 31, 60, 63 and 92:

Oka et al disclose a storage battery comprising an anode, a cathode and a separator film (COL 12, lines 31-65/ ABSTRACT). Figure 5 illustrates the separator film interposed between the cathode and the anode (FIGURE 5/ COL 13, lines 53-60). Oka et al further disclose that the separator film is formed as a hydrophilized oriented film made of hydrophobic resin and a hydrophilic polymer so that the separator has a hydrophilic portion and a hydrophobic portion (ABSTRACT). Polyvinylidene fluoride is an exemplary hydrophobic resin (COL 6, line 54) and polyvinylpyrrolidone is an hydrophilic polymer (COL 7, lines 27-36). *The particular method of operating the electrochemical system is inherent to the operation of the battery above.*

With respect to claims 32-33, 39, 64-65 and 71:

Oka et al disclose that the separator can be applied to a storage battery such as Ni-Cd battery or Ni-hydrogen battery, or a nonaqueous battery such as lithium battery or a sodium battery (COL 12, lines 31-40). The anode active material is generally prepared from cadmium, zinc, or iron; and the cathode is made of manganese-based compound (COL 12, lines 31-65). *Thus, the anode includes a metal material, and the cathode includes a material being*

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electrochemically couple-able with the anode material. Additionally, it is further noted that during a normal operation of a battery cell, the battery is subject to charge/discharge cycles.

Concerning claims 37 and 69:

Figure 5 illustrates the battery comprising a layered structure including the separator 51, the cathode 52 and the anode 53 (FIGURE 5/ COL 13, lines 53-60).

Oka et al disclose an electrochemical system as described above. However, Oka et al does not expressly disclose the specific single-phase, non-porous membrane structure; and the specific weight ratio.

As to claims 31, 60, 63 and 92:

Hedge et al disclose the formation of hydrophilic-hydrophobic membranes using a plurality of polymers where one or more of the polymers used is a hydrophobic polymer and one or more of the polymers is a hydrophobic polymer (COL 2, lines 39-43, lines 47-50, lines 58-60/ COL 4, lines 6-10, lines 57-63).

Hedge et al further disclose that the membrane refers to a layer of material which is formed by applying a solution containing a polymer mixture of polymers, and function as a stand-alone structure (COL 5, lines 17-27); wherein by dissolving is meant mixing a solid or solids with a liquid such that a true solution thereof in the liquid is formed (COL 5, lines 30-34); wherein the true solution refers to a uniform, homogeneous mixture of components in which the major component of the solution appears homogeneous (COL 5, line 64 to COL 6, line 5).

Hedge et al yet further disclose that it is particularly important that the solvent selected be one which is capable of forming true solutions of each of the polymers (COL 7, lines 45-50); and the temperature at which it is maintained should be selected such that each of the polymers form a

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true solution wherein phase separation does not occur i.e. below the LCST and above the UCST (**emphasis added**) (COL 7, lines 63 to COL 8, lines 20). Hence, Hedge et al at once envisage forming a single phase polymer mixture comprising both the hydrophobic matrix polymer and the hydrophilic polymer.

Additionally, Hedge et al disclose forming selectively porous membranes to create membranes that are non-porous in some areas, and/or non-porous membranes (COL 12, lines 19-67). *Therefore, Hedge et al envisions forming non-porous membranes; and since the present claims are completely silent as to whether the non-porous structure covers the entire surface or partial surface thereof, the prior art of record meets the claimed requirement of providing a non-porous structure at least in some areas.*

On the matter of claims 56-59 and 88-91:

Hedge et al use weight/weight ratio of poly(vinylidene fluoride) to poly(N-vinylpyrrolidene) from about 1:0.5 to about 1:2, and/or about 1:1 (COL 3, lines 1-9); and that the thickness of the membrane can be varied by controlling the viscosity of the PVDF/PVP, which in turn, can be adjusted by varying the w/w percentage of the polymers (COL 12, lines 5-12). *Therefore, the specific hydrophobic to hydrophilic content is taught to be a result-effective variable, and the discovery of optimum of result effective variable in known process is ordinarily within the skill of art. In re Boesh 205 USPQ 215 (CCPA 1980).*

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to use the specific single-phase, non-porous polymer membrane structure of Hedge et al in the electrochemical system of Oka et al as Hedge et al teach that their specific single-phase, non-porous polymer membrane structure exhibits mechanical strength, chemical

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resistance, heat stability; and also have considerable utility in the field of ion exchange (COL 1, line 14). Thus, it is further asserted that the two references are pertinent to one another as they both address the same problem of providing suitable polymeric membrane structure for ion exchange applications and by combining together a hydrophilic material with a hydrophobic material.

With respect to the specific weight ratio, since Hedge et al disclose that the specific weight ration of the polymer mixture can be adjusted to vary the viscosity and in turn the membrane thickness, the specific weight ratio (i.e. hydrophobic to hydrophilic content) is taught to be a result-effective variable, and the discovery of optimum of result effective variable in known process is ordinarily within the skill of art. In re Boesh 205 USPQ 215 (CCPA 1980).

11. Claims 38, 40, 70 and 72 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oka et al 5830603 in view of Hedge et al 6395325 as applied to claims 31 and 63 above, and further in view of Munshi 2004/0151985.

Oka et al and Hedge et al are applied, argued and incorporated herein for the reasons above. However, the preceding prior art does not expressly disclose the specific tin anode.

Munshi discloses batteries including a polymer membrane and/or separator per se (SECTION 0015). It is disclosed that the polymer electrolyte (acting as the separator) can be combined with various negative electrodes such as tin oxide electrodes, among others (SECTION 0033).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to use the specific tin anode of Munshi in the battery system of both Oka et

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al and Hedge et al as Munshi teaches that such tin anode can be used in batteries and provides batteries and supercapacitors having high specific energy, and energy density, high cycle life, low self-discharge and improved safety.

12. Claims 46-49 and 78-81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oka et al 5830603 in view of Hedge et al 6395325 as applied to claims 31 and 63 above, and further in view of Maletin et al 2002/0097549.

Oka et al and Hedge et al are applied, argued and incorporated herein for the reasons above. However, the preceding prior art does not expressly disclose the specific capacitor and the electrode thickness.

Maletin et al disclose a double layer capacitor having a polarizable carbon electrode (SECTION 0090/ ABSTRACT) with a separator between the electrodes (SECTION 0031-0032). An exemplary embodiment shows the use of a separator made of silicon oxide carried in a PVDF/NMP paste (SECTION 0103). *It is noted that silicon oxide is considered an inorganic polymer, and is also considered to be hydrophilic.*

In addition, Maletin et al disclose that the thickness of the electrodes can be varied to adjust capacitance (SECTION 0111). *Thus, the thickness of the electrodes is taught to be a result effective variable, and the discovery of optimum of result effective variable in a known process is ordinarily within the general knowledge of those skilled in the art. See In re Boesch 205 USPQ 215 (CCPA 1980).*

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to embody the capacitor's teachings of Maletin et al in the electrochemical

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system of Oka et al and Hedge et al as Maletin et al teaches that such a capacitor is a reliable electrochemical power source demonstrating low term impedance and high power capabilities, and exhibiting superior performance characteristics.

With respect to the specific electrode thickness, given that Maletin et al teach that the specific electrode thickness can be varied to adjust capacitance, it is thus contended that the specific electrode thickness is taught to be a result-effective variable, and the discovery of optimum of result effective variable in known process is ordinarily within the skill of art. In re Boesh 205 USPQ 215 (CCPA 1980).

Allowable Subject Matter

13. The indicated allowability of claims 38, 40 and 56-59 is withdrawn in view of the newly discovered references as applied in the art rejection hereinabove. Rejections based on the newly cited references has been set forth supra.

Response to Arguments

14. Applicant's arguments with respect to the foregoing claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Raymond Alejandro
Primary Examiner
Art Unit 1745


**RAYMOND ALEJANDRO
PRIMARY EXAMINER**